

RELATION OF MAY-JUNE WEATHER CONDITIONS IN JAMAICA TO THE CARIBBEAN TROPICAL DISTURBANCES OF THE FOLLOWING SEASON

By J. F. BRENNAN, Government Meteorologist

[Kingston, Jamaica, B. W. I., January 1935]

The island of Jamaica is near the southwestern limit of the zone exposed to the August and September hurricane tracks.

If the observations during the 3 months of May, June, and July, as given in table 1, be studied, it will be obvious that, in most cases, when the island mean rainfall is excessive, the mean surface wind below the daily normals, and the daily mean barometric pressure below the normal, there is much likelihood of the development of disturbed weather conditions in the eastern Caribbean, particularly during the ensuing months of August and September. Conversely, when during the same 3 months the island mean rainfall is deficient, the mean surface wind above the daily normals, and the daily mean barometric pressure consistently above the normal, there is little likelihood of disturbances occurring in the following months of August and September.

If the years 1903, 1915, 1916, 1932, and 1933, when there was considerable storm activity, be selected, it will be evident that from May to July the mean island rainfall was above the normal, the mean surface wind deficient and the mean barometric pressure below the normal, as shown in table 1 (a) and reproduced in table 2.

By referring to table 3, extracted from table 1 (b), quite the opposite indications are presented. The years 1907, 1920, 1922, 1929, and 1934 belong to a group of periods which may be identified as being devoid of hurricanes or as having very little storm activity.

The two groups (tables 2 and 3) extracted from table 1, may be regarded merely as sufficient to demonstrate the possible existence of antecedent causes, during the 3 months preceding the hurricane season, or they may be taken as governing factors to indicate the character of the forthcoming storm period.

Tables 2 and 3 are not exhaustive, but only examples; table 2 may be added to by including the year 1931, when the rainfall total, May to July, was 33.03 inches, which is over 50 percent above the normal. The wind, 187 miles per day, was equivalent to 83 percent of the normal of 225 miles. The barometric pressure was 29.903 inches, or 0.013 inches below the 33-year average. During the year 1931 there was a storm of some intensity on August 13, passing to the south of Jamaica and moving westward.

The year 1925 also might have been included in table 3, when the rainfall was deficient, wind above the normal, and the barometric pressure above the normal. Under such conditions there should be expected an absence of hurricanes, and none was reported.

Consequently, there appears to be some evidence that at least 12 out of 29 years furnished definite indications of the coming storm conditions in August and September.

In the foregoing tables it will be noted that in 2 and 3 the mean low pressure and high pressure are deduced from 3 consecutive months (May to July, 92 days).

During this period, for each year, there existed several individual days having fluctuations of pressure of both low and high. It is thus only the general means for these combined 3 months which appear to be the governing factors; individual days of high or low pressure do not appear to be important.

The line AB of figure 1 is the mean 29.90-inch isobar for May, June, and July. South of this line the pressure is less; north of it greater.

Daily observations at the point marked X are needed as it is just possible that the general mean high or low pressure departures (during the 3 months mentioned) are determined in that area more than in Jamaica. It is notable that the isobars for the months of August and September lie nearly on the lines of average hurricane tracks in these tropical waters.

As there is no likelihood, at present, of establishing a suitable station for surface observations at X, the only

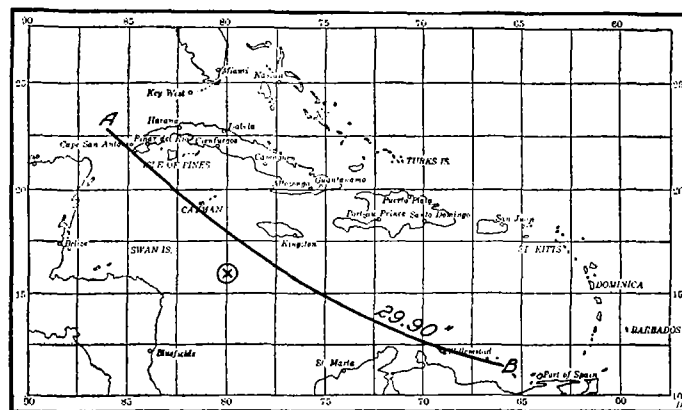


FIGURE 1.

course left is to await results for coming years before attempting to determine expected weather in August and September from surface data. It would be unwise and premature to issue forecasts to the public until the matter receives further investigation.

The preceding tables of surface observations may be supplemented by a brief statement of the character of the upper air observations, at Kingston, in the year 1929, when there was an absence of hurricanes, and in the year 1933 when there was abnormal activity in the Caribbean region: In the year 1929, from May to July, the wind velocity at altitudes about 1,000 to 2,500 meters showed, consistently, an excess over the 10-year averages; and in the year 1933 there was the opposite, for the upper air velocity fell below the normals. This corresponded with the changes in the surface wind records; the velocity of the wind at certain altitudes reflects its force and direction near the surface.

TABLE 1.—Amount of rainfall, mean daily miles of wind and mean barometric pressure during the combined months of May, June, and July 1903 to 1934

Year	Combined total rainfall for 3 months	Combined mean daily miles of wind for 3 months	Mean daily barometric pressure for 3 months
	Normal for 60 years 20.05 inches	Normal for 25 years 225 miles	Normal for 33 years, 29.934 inches
	Inches	Miles	Inches
1903 (a).....	20.93	220	29.919
1907 (b).....	15.34	190	29.945
1908.....	20.74	194	29.958
1909.....	18.78	183	29.943
1910.....	16.54	178	29.960
1911.....	17.34	238	29.953
1912.....	11.33	267	29.951
1913.....	16.34	225	29.956
1914.....	14.80	249	29.951
1915 (a).....	24.16	220	29.910
1916 (a).....	29.44	191	29.907
1917.....	20.88	207	29.944
1918.....	21.22	210	29.927
1919.....	22.30	243	29.927
1920 (b).....	15.74	240	29.937
1921.....	22.17	225	29.929
1922 (b).....	11.79	263	29.947
1923.....	14.54	273	29.930
1924.....	16.17	222	29.939
1925.....	14.78	230	29.941
1926.....	13.76	213	29.928
1927.....	19.20	220	29.953
1928.....	14.64	241	29.930
1929 (b).....	12.32	257	29.958
1930.....	15.47	244	29.938
1931.....	33.03	187	29.903
1932 (a).....	22.54	213	29.903
1933 (a).....	31.40	207	29.908
1934 (b).....	15.69	237	29.936

NOTE.—The years denoted by (a) in this table are reproduced in table 2, so as to group together the periods of abnormal hurricane activity; and those denoted by (b), years of no hurricanes or but few, table 3.

The above table is derived from (1) the publication entitled "The Rainfall of Jamaica" 60-year period, page 30, and subsequent Jamaica Weather Reports years 1930 to 1934, (2) the Jamaica Weather Report No. 689, Table (C) p. 9, giving the Kingston daily mean total miles of Wind, and (3) the mean barometric pressures from the 7 a. m. and 3 p. m. daily observations, as shown in the respective printed Jamaica Weather Reports, 1903 to 1934.

TABLE 2.—5 years of instances (during the period from 1903 to 1934) when the months of May, June, and July indicate abnormal conditions of rainfall, surface wind, and barometric pressure, favorable to hurricane activity during the months of August and September, in the Caribbean region

Year	Combined total rainfall for 3 months	Combined mean daily miles of wind for 3 months	Mean daily barometric pressure for 3 months
	Normal for 60 years, 20.05 inches	Normal for 25 years, 225 miles	Normal for 33 years, 29.934 inches
	Inches	Miles	Inches
1903.....	20.93	220	29.919
1915.....	24.16	220	29.910
1916.....	29.44	191	29.907
1932.....	22.54	213	29.903
1933.....	31.46	207	29.908

TABLE 3.—5 years of instances (during the period from 1903 to 1934) when the months of May, June, and July indicate abnormal conditions of rainfall, surface wind, and barometric pressure, favorable to the absence of hurricane activity, during the months of August and September, in the Caribbean region

Year	Combined total rainfall for 3 months	Combined mean daily miles of wind for 3 months	Mean daily barometric pressure for 3 months
	Normal for 60 years, 20.05 inches	Normal for 25 years, 225 miles	Normal for 33 years, 29.934 inches
	Inches	Miles	Inches
1907.....	15.34	190	29.945
1920.....	15.74	240	29.937
1922.....	11.79	263	29.947
1929.....	12.32	257	29.958
1934.....	15.69	237	29.936

THE DROUGHT OF 1933-34 IN NEW MEXICO

By MARSHALL J. CHAMBERS

[Weather Bureau, Albuquerque, N. Mex., January 1935]

One definition of drought is: "A continued lack of rainfall so long as to very seriously affect vegetation in a region where the average rainfall and its seasonal distribution normally are sufficient to sustain plant growth and produce crops." Various other definitions of drought have been used, but none of these covers the situation in New Mexico quite so well as the one just given.

The normal course of precipitation in New Mexico is a gradual increase from a minimum in January to a maximum in July and August, followed by a gradual decrease to November. This is considerably modified, however, by the heavy snowfall which occurs at higher mountain elevations during winter and spring months. The amount of snowfall shows a fairly uniform rate of increase with altitude, being about 30 inches annually at 7,000 feet; 50 inches from 8,000 to 9,000 feet; 100 inches at 10,000 feet; and, at a few stations at the crest of the Sangre de Cristo range, more than 200 inches. Normally much of this snow accumulates at the high levels, where it melts in late spring and early summer and furnishes water used for irrigation of the fertile lower-valley lands.

The 1933-34 drought was by far the most severe of any in the history of the State. There have been periods when less precipitation was received but never before a drought when temperatures remained so consistently high for so long a time. It is difficult to exactly date the beginning of this drought, but in terms of

whole months, deficient precipitation began with September 1933.

During the following winter and spring there was but slight snowfall. February received the largest fall, 80 percent of its average amount, while December, commonly the month of greatest depth, had but 35 percent, and the entire season only 52 percent, of the normal. The scant snow cover was further reduced by the prevalence of unusually high temperatures, which caused excessive melting that resulted in a greatly reduced depth of stored snow at the close of the season.

Precipitation closely approximated the seasonal trend to the close of January 1934, although the amounts were considerably lower than usual. Of the following months, only May gave precipitation that averaged slightly above the normal, and this was due to the occurrence of thunder showers in the last decade. These showers were very local in character and of brief duration, and the little moisture absorbed by the soil was soon dissipated by the excessive heat of the last 4 days of the month. June gave 42 percent and July 52 percent of the normal precipitation.

Average monthly mean temperatures were well above the normal from the beginning of June 1933 through August 1934. During this period, the months of September and October 1933 and May and July 1934 were the warmest of record. The latter gave the highest average mean temperature ever observed in the State.